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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,540	06/11/2005	Shahram Mihan	LU 6084 (US)	4071
34872	7590	10/18/2007	EXAMINER	
BASELL USA INC.			LEE, RIP A	
INTELLECTUAL PROPERTY			ART UNIT	
912 APPLETON ROAD			PAPER NUMBER	
ELKTON, MD 21921			1796	
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			10/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/538,540

Applicant(s)

MIHAN ET AL.

Examiner

Rip A. Lee

Art Unit

1796

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 July 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-24 and 27-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-24 and 27-29 is/are rejected.
- 7) ☒ Claim(s) 20, 21, 23, 24, and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 07-20-2007.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

This office action follows a request for continued examination (RCE) under 37 § C.F.R. 1.114, filed on July 20, 2007. Claims 16-24 and 27-29 are pending.

Claim Objections

1. Claims 20, 21, 23, 24, and 25 are objected to because of the following informalities: The claims indicate that the at least one activating compound is optional. There is no evidence in the record to suggest that active catalysts containing the claimed metallocene do not contain at least one activating species. Appropriate correction is required.

Claim Rejections - 35 USC § 102 / 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 21 and 22 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wang (WO 01/92346; equivalent document U.S. 6,723,675).

Wang teaches a catalyst comprising the bridged chromium complex, [(2-quinolinyl)methyl](C₅Me₄)CrCl₂ (compounds VI), *inter alia* (col. 3, line 33 – col. 4, line 27, particularly, col. 3, line 52; R² and R³ are linked to form an indenyl group). It is clear that prior art teaches a catalyst containing chromium complexes having the structural features recited in the claims. Therefore, the subject matter of claims 21 and 22 is anticipated by Wang. Catalysts of the invention are used to make ethylene/C₃-C₂₀ alpha olefin copolymers (claim 12). The prior art is silent regarding the properties associated with ethylene/C₃-C₂₀ alpha olefin copolymers prepared from the catalysts cited above, however, in light of the fact that the catalyst is the same as that recited in the instant claims, it follows that products prepared from the same catalyst exhibit the same properties. Since the PTO can not conduct experiments, the burden of proof is

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shifted to the Applicants to establish an unobviousness difference. *In re Fitzgerald*, 619 F.2d. 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02.

4. Claim 24 is also rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wang.

The discussion of the disclosures of the prior art from the previous paragraph of this office action is incorporated here by reference. The prior art teaches the catalyst recited in claim 24, and the reference teaches that catalysts are used for preparing ethylene/C₃-C₂₀ alpha olefin copolymers. Based on these facts, it is deemed that the disclosure of Wang, taken as a whole, teaches a process comprising essentially the same step recited in instant claim 24. It follows that ethylene/C₃-C₂₀ alpha olefin copolymers prepared by essentially the same process using the same catalyst will exhibit essentially the same properties, and therefore, it is maintained that ethylene/C₃-C₂₀ alpha olefin copolymers prepared by the catalyst of Wang inherently possesses the properties recited in the claims. Since the PTO can not conduct experiments, the burden of proof is shifted to the Applicants to establish an unobviousness difference. *In re Fitzgerald*, 619 F.2d. 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02.

5. Claims 16-19, 20, 29 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wang.

Wang teaches a catalyst containing the bridged complex, (2-pyridylmethyl)(Ind)CrCl₂ (compound 5). This compound possesses structural features that meet the structural features set forth in the instant claims. Catalysts of the invention are used in a process of polymerizing ethylene and C₃-C₂₀ α-olefin (claim 12). Based on these facts, it is deemed that the disclosure of Wang, taken as a whole, teaches a process comprising the same catalyst and essentially the same step recited in instant claims 20 and 29. It follows that ethylene/C₃-C₂₀ alpha olefin copolymers prepared by essentially the same process using the same catalyst will exhibit essentially the same properties, and therefore, it is maintained that ethylene/C₃-C₂₀ alpha olefin copolymers prepared by the catalyst of Wang inherently possesses the properties recited in claims 16-20. Since the PTO can not conduct experiments, the burden of proof is shifted to the Applicants to establish an

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unobviousness difference. *In re Fitzgerald*, 619 F.2d. 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02.

The subject matter of claim 28 is disclosed in column 3, line 10, in which Wang *et al.* teaches molded articles and films as end use for inventive polymers.

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Welch *et al.* (U.S. 5,498,581).

Wang contemplates that inventive catalysts may be in the form of prepolymer (page 10, lines 22-29), but there is not teaching as to how this type of catalyst is made. Welch *et al.* teaches that 5-80 wt % of prepolymer relative to the mass of resulting prepolymerized solid catalyst system is a practical working range for transition metal catalyzed olefin polymerizations. It would have been obvious to one of ordinary skill in the art to make the claimed prepolymer catalyst system because Wang contemplates such an embodiment, and one skilled in the art would have found it obvious to use the amount taught by Welch *et al.* in making the prepolymer of Wang because Welch *et al.* furnishes an otherwise obvious missing element. Since this has been shown to produce useful catalysts, the skilled artisan would have expected such an embodiment to work. In sum, the claimed prepolymerized catalyst is obvious over Wang in view of Welch *et al.*

Catalysts of the invention are used to make ethylene/C₃-C₂₀ alpha olefin copolymers. The prior art is silent regarding the properties associated with ethylene/C₃-C₂₀ alpha olefin copolymers prepared from the catalysts cited above, however, in light of the fact that the catalyst is essentially the same as that recited in the instant claims, it follows that products prepared from the essentially the same catalyst exhibit essentially the same properties. Since the PTO can not conduct experiments, the burden of proof is shifted to the Applicants to establish an unobviousness difference. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

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7. Claims 16-22, 24, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mihan *et al.* (WO 01/12641; equivalent U.S. 6,437,161 relied upon for translation and pagination).

Mihan *et al.* teaches a general catalyst system comprising (un)substituted monocyclopentadienyl chromium (III) complexes. The transition metal component has structure defined by structural components (I) and (II), as shown in claim 1. One notes that the π -ligand has bridging group B and pendant moiety Z. The bridging group is of formula $L^2(R^{13})(R^{14})$ where L^2 is carbon or silicon. Pendant Z is a heterocyclic moiety, and one finds in column 5 that Z is an 8-quinolyl group and substituted derivatives thereof (col. 6, lines 10-12). Mihan *et al.* shows a working example of a catalyst containing the compounds (8-quinoliny)(Ind)CrCl₂ and (2-Me-8-quinoliny)(Me₄C₅)CrCl₂ (examples 8 and 9). There is no working example in which chromium complexes contain a bridging group.

Despite this, one learns in col. 4, lines 25-37 that if Z is a fused heterocyclic or heteroaromatic ring system, then B is $L^2(R^{13})(R^{14})$ where L^2 is carbon or silicon. Proceeding further, the skilled artisan learns that the combination of B as C(CH₃)₂ or Si(CH₃)₂ with 8-quinoliny is preferred (col. 6, lines 25-31). Thus, it would have been obvious to one having ordinary skill in the art, having examples 8 and 9 as guidance, to make a catalyst comprising [Me₂Si(8-quinoliny)(Ind)]CrCl₂, [Me₂C(8-quinoliny)(Ind)]CrCl₂, and their corresponding 2-methylindenyl analogues, because the prior art teaches these preferred embodiments. In summary, it would have been obvious to one having ordinary skill in the art to make the catalyst of instant claims 21 and 22 from the complete disclosure of Mihan *et al.*

Catalysts of the invention are especially useful for making ethylene/C₃-C₁₂ alpha olefin copolymers (col. 10, line 16). Since the inventors teach this particular application, it would have been obvious to one having ordinary skill in the art to use the catalyst containing [Me₂Si(8-quinoliny)(Ind)]CrCl₂, [Me₂C(8-quinoliny)(Ind)]CrCl₂, or their corresponding 2-methylindenyl analogues, for making ethylene/ alpha olefin copolymers. That is, it would have been obvious to one having ordinary skill in the art to carry out the process of instant claims 20 and 29 from the disclosure of Mihan *et al.*

The prior art is silent regarding the properties associated with ethylene/C₃-C₁₂ alpha olefin copolymers prepared from the catalysts cited above, however, in light of the fact that the catalyst is essentially the same as that recited in the instant claims, it follows that products prepared from the the same catalyst in essentially the same process exhibit essentially the same properties. Since the PTO can not conduct experiments, the burden of proof is shifted to the Applicants to establish an unobviousness difference. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

8. Claims 16-18, 27 and 28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kale *et al.* (U.S. 6,420,507).

Kale *et al.* teaches a series of ethylene/octene copolymer exhibiting a density of about 0.870 g/cm³, M_n on order of about 44,000-57,000, and M_w/M_n in the range of about 2.2-2.8 (see entries 1a-c and 2a-d in tables 2 and 5). Copolymers prepared from these catalysts also exhibit bimodal short chain branching distribution (col. 54, line 36; Table 6 shows the presence of two distinct product fractions). Furthermore, polymers are characterized by a having at least 0.04 vinyl groups/1000 C atoms (col. 40, lines 40-42). The reference is silent with regard to the CDBI and side chain branching per 1000 carbon atoms, however, light of the fact that the copolymer exhibits essentially the same properties and in view of the fact that the branching distribution is bimodal, a reasonable basis exists to believe that the claimed broad CDBI and side chain branching range is associated with bimodal distribution,[†] and therefore, these properties are also exhibited by the polymers of Kale *et al.* Since the PTO can not conduct experiments, the burden of proof is shifted to the Applicants to establish an unobviousness difference. *In re Fitzgerald*, 619 F.2d. 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02.

Preparation of blend is disclosed in Kale *et al.* (col. 6, line 50), and inventive polymers find utility in fibers, films, and molded articles (col. 6, line 6).

[†] A CDBI of less than 50 % indicates that the amount of comonomer incorporated into each polymer chain varies over a broad range. That is, the branching distribution is non-uniform, and the value is associated with a broad short chain branching distribution.

Response to Arguments

9. Applicant traverses the claim objections. While there is adequate support for the claim language, it is noted that the claims are drawn to a catalyst and a process of use of said catalyst. While Applicant's claims may be prophetic, they must be bounded by scientific principle. By definition, the catalyst must be an active species. There is no evidence in the record that the claimed coordinatively saturated organochromium complexes are capable of polymerizing olefin in absence of an activator/co-catalyst. Therefore, it is the examiner's position that the activating compound is not an optional component. For these reasons, the claim objection has been maintained.

Applicant's arguments with respect to the rejection of claims based on Wang (WO 01/92346), Mihan *et al.* (WO 01/12641), and Kale *et al.* (U.S. 6,420,507), have been considered but are moot in view of the new grounds of rejection for each of the references.

The rejection of claims over Jejelowo *et al.* (U.S. 5,281,679) has been withdrawn. Applicant implies in the response that the prior art does not disclose an at least bimodal SCB distribution. It would appear the polymer cited in the prior art would contain both high and low molecular weight fractions containing SCB since the overall CDBI is 25.9 % (non-uniform branching distribution) and because the polymer has a significant hexanes soluble fraction (low molecular weight components and components with high frequency of SCB). However, present claims now recite a vinyl group content of from 0.1-1 vinyl groups/1000 C atoms. Jejelowo *et al.* does not teach this characteristic, and there is nothing in the text to suggest that the cited polymer necessarily exhibits such a feature. The preponderance of evidence leads to the conclusion that the polymer described in claim 16 is patentably distinct over the polymer described in Jejelowo *et al.*

Prior Art

The prior art made of record but not relied upon is considered pertinent to the Applicant's disclosure. The following references have been cited to show the state of the art with respect to polymers containing SCB.

Chum *et al.* (U.S. 5,089,321) discloses three low density polyethylene (ethylene/octene copolymer) resins labeled A, B, and C, having a density of 0.912, not more than 15 wt % of the polymer fraction having a degree of branching $\leq 2 \text{ CH}_3/1000 \text{ C atoms}$, and not more than 25 wt % of the polymer fraction having a degree of branching $\geq 25 \text{ CH}_3/1000 \text{ C atoms}$. Two samples are commercially available as Attane 4001 and Attane 4002 (M_w/M_n approx. 3). There is no disclosure of the modality of SCB or vinyl group content.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu S. Jagannathan, can be reached at (571)272-1119. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).



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October 15, 2007